



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,934	11/04/2003	Yukihiro Shibata	501.43163X00	3889

20457 7590 04/25/2006

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

TON, TRI T

ART UNIT	PAPER NUMBER
----------	--------------

2877

DATE MAILED: 04/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/699,934	Applicant(s) SHIBATA ET AL.	
	Examiner Tri T. Ton	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 and 18 is/are allowed.
- 6) ☒ Claim(s) 5-14 is/are rejected.
- 7) ☒ Claim(s) 1-4 and 19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/04/03</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 11/04/03 has been entered. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Oath/Declaration

3. The Oath and Declaration filed on 04/14/2004 is acceptable.

Drawings

4. The drawings were received on 11/04/2003. These drawings are not acceptable because the following reasons.

Figure 4, element 42 is not mentioned in the spec.

Figure 6, element 4 should be changed to element 5.

Figure 7, element 4' and 5' are not mentioned in the spec.

Figure 10, element 80' is not mentioned in the spec.

Specification

5. The disclosure is objected to because of the following informalities:

Page 7, line 16 Figs. A and 3B is not correct.

Page 12, line 9 reflected of f is misspelled.

Page 13, line 28 level 5210c is not correct.

Page 18, line 6 reflected of f is misspelled.

Page 19, line 19 reflected of f is misspelled.

Appropriate correction is required.

The examiner respectfully suggests revision as follow:

Page 7, line 16 Figs. A and 3B should be Figs. 3A and 3B.

Page 12, line 9 reflected of f should be reflected off.

Page 13, line 28 level 5210c should be level S210c.

Page 18, line 6 reflected of f should be reflected off.

Page 19, line 19 reflected of f should be reflected off.

Claim Objections

6. Claims 1, 4, 16 and 19 are objected because of the following informalities:

Claim 1, line 5 composing the applied beams, meaning is not clear.

Claim 4, line 3 reflected of f is misspelling.

Claim 16, line 4 the other one of the beams of light is allowed to, meaning is not clear.

Claim 19, line 5 reflected of f is misspelling.

Appropriate correction is required.

The examiner respectfully suggests revision as follow:

Claim 1, line 5 composing the applied beams should change to composing the applied of said divided four beams.

Claim 4, line 3 reflected of f should be reflected off.

Claim 16, line 4 the other one of the beams of light is allowed to should change to the other one of the beams of light branched by the braching means is allowed to.

Claim 19, line 5 reflected of f should be reflected off.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant presently claims (implicitly) means for the major axes of elliptically polarized light have the same condition with respect to said sample. The disclosure, however, is not seen as adequately teaching the same condition means.

As examiner understood, the same condition means maximum defect detecting sensitivity, and claim 5 would be rewritten as the following:

A method of inspecting for defects comprising the steps of: applying illuminating light corresponding to two or more diffraction directions of patterns formed on a sample so that major axes of elliptically polarized light have the maximum defect detecting sensitivity with respect to said sample; forming an image by using a component of a polarized light vector in a particular direction in light reflected off said sample; and detecting defects by using said image.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 5, 8-9 are rejected under 35 U.S.C. 102(e) as being taught by Shibata (U.S. Patent No. 6,690,469 B1.)

Regarding Claim 5, Shibata teaches a method of inspecting for defects comprising: applying illuminating light corresponding to two or more diffraction directions of patterns formed on a sample (column 11, lines 16-22) so that major axes of elliptically polarized light have the maximum defect detecting sensitivity with respect to said sample (column 12, lines 29-38); forming an image by using a component of a polarized light vector in a particular direction in light reflected off said sample (column 6, lines 54-63); and detecting defects by using said image (column 3, lines 14-16).

Regarding Claim 8, Shibata teaches a method of inspecting for defects comprising: illuminating a sample with bright-field illuminating light and dark-field illuminating light through a polarized beam splitter (column 11, lines 7-13 and lines 21-25), (Figure 10a); imaging an optical image of said sample which is bright-field illuminated and dark-field illuminated (column 11, lines 26-30), (Figures 10b, 10c, 10d); and comparing the image of said sample obtained by the imaging with a reference image to detect defects of said sample (Abstract, lines 16-21), wherein distribution of the amount of light of said bright-field illumination and said dark-field illumination is adjusted according to the direction in which an electric field vector enters said polarized beam splitter (column 11, lines 30-43).

Regarding Claim 9, Shibata teaches the light used in the bright-field illumination and the light used in the dark-field illumination are emitted from the same light source (Figure 10a, element 180).

10. Claims 6 and 13 are rejected under 35 U.S.C. 102(e) as being taught by Kerstens et al. (U.S. Patent No. 5,248,876.)

Regarding Claim 6, Kerstens et al. teaches a method of inspecting for defects comprising: illuminating a substrate having patterns formed on its surface with four polarized beams (column 11, lines 45-48), through an objective lens (Figure 14, element 108), whose directions of electric field vectors are aligned (column 11, lines 23-37); imaging said substrate by forming an optical image on a sensor surface according to reflected light from said substrate which has entered said objective lens during the illumination (column 11, lines 34-37); and inspecting for defects on a surface of said substrate by processing the image obtained by the imaging (column 1, lines 67-68 and column 2, lines 1-2).

Regarding Claim 13, Kerstens et al. teaches an apparatus for inspecting for defects comprising: a light source (Figure 14, element 100); illuminating means illuminating a substrate having patterns formed (Figure 14, element 112) thereon with light that has been emitted from the light source and divided into four beams (column 11, lines 45-48); image forming means for composing each of said four beams after being reflected off said substrate being illuminated by the illumination means and forming an optical image of said illuminated substrate (column 11, lines 23-37); image

obtaining means detecting an optical image of said substrate as formed by the image forming means and obtaining an image of said substrate (column 11, lines 34-37), (Figure 14, element 468); and defect detecting means processing the image obtained by the image obtaining means and detecting defects on said substrate (column 1, lines 67-68 and column 2, lines 1-2).

11. Claims 10 and 12 are rejected under 35 U.S.C. 102(e) as being taught by Bultman et al. (Publication No. U.S 2004/0092045 A1.)

Regarding Claim 10, Bultman et al. teaches a method of inspecting for defects comprising: illuminating a substrate having patterns formed on its surface (Fig 1); imaging the illuminated substrate, and inspecting for defects on a surface of said substrate by processing the image obtained by the imaging (paragraph [0168], [0169], Figure 3, elements 36, 38 and 40), wherein, in said illuminating step, bright-field illumination and a combination of bright-field and dark-field illumination are switched for illuminating said substrate (paragraph [0012], lines 13-17), in accordance with a type of a pattern formed on the surface of said substrate (paragraph [00163], line 9-19).

Regarding Claim 12, Bultman et al. teaches a method of inspecting for defects comprising: the light used in the bright-field illumination and the light used in the dark-field illumination are emitted from the same light source in said illuminating step (Figure 3, element 44).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kerstens et al. (U.S. Patent 5,248,876) in view of Shibata et al. (U.S. Patent No. 6,690,469 B1).

As to claim 7, Kerstens et al. teaches all the steps as applied to claim 6 except zero-order light of the light reflected from said substrate and the directions of electric field vectors. Shibata et al. teaches a method of inspecting for defects, wherein an optical image is formed by adjusting the amount of zero-order light of the light reflected from said substrate (column 1, lines 63-67) and the directions of electric field vectors in said step of imaging (column 2, lines 29-37). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Kerstens et al. with the teachings of Shibata et al. to include zero-order light of the light reflected and the directions of electric field vectors. Thus, detecting object patterns for inspection at a high resolution, enabling detection of finer defects.

14. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bultman et al. (Publication No. 2004/0092045 A1) in view of Shibata et al. (U.S. Patent No. 6,690,469 B1).

As to claim 11, Bultman et al. teach all the steps as applied to claim 10 except differential interference. Shibata et al. teaches a method of inspecting for defects, wherein said bright-field illumination used in said illuminating step is the one in which differential interference is available (column 5, lines 39-45). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Bultman et al. with the teachings of Shibata et al. to include bright-field illumination used in said illuminating step is the one in which differential interference is available. Thus, the image resolution can be improved and easier to detect defect patterns.

15. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kerstens et al. (U.S. Patent 5,248,876) in view of Zhao et al. (U.S. Patent No. 6,718,082 B2).

As to claim 14, Kerstens et al. teach all the steps as applied to claim 13 except birefringent prisms. Zhao et al. teaches the light emitted from the light source is divided into two beams by one of the two birefringent prisms, and each of said two divided beams is further divided into two beams by the other birefringent prism (Figure 1, element 30 and element 50). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Kerstens et al. with the teachings of Zhao et al. to include birefringent prisms. Thus, polarization beams can be switched and divided flexibly and enhance reliability for test device.

Allowable Subject Matter

16. **Claims 1-4 and 15-19 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.**

The following is a statement of reasons for the indication of allowable subject matter: there was no prior art found by the examiner that suggested modification or combination with the cited art so as to satisfy the combination of all the limitations in claims 1, 15, 16 and 17.

17. As to claim 1, the prior art of record, taken alone or in combination, fails to disclose or render limitations "composing the applied of said divided four beams that have been reflected off said sample and passed through said objective lens into a composed beam of light."

18. As to claim 15, the prior art of record, taken alone or in combination, fails to disclose or render limitations "and said image forming means has a second polarization adjusting part adjusting the polarization direction of the beam made by composing each reflected light of said four beams from said substrate."

19. As to claim 16, the prior art of record, taken alone or in combination, fails to disclose or render limitations "and the other one of the beams of light branched by the branching means is allowed to enter an oblique illuminating means illuminating said substrate obliquely".

20. As to claim 17, the prior art of record, taken alone or in combination, fails to disclose or render limitations "a dark-field illuminating means illuminating said substrate

obliquely from outside of said objective lens with the other one of the beams of light branched by said branching means."

Conclusion


21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references of Bultman et al. (Publication No. 2004/0092045 A1), Shibata et al. (U.S. Patent No. 6,690,469 B1), Kerstens et al. (U.S. Patent 5,248,876) and Zhao et al. (U.S. Patent No. 6,718,082 B2) teach of various features similar to the claimed invention.

Fax/Telephone Information

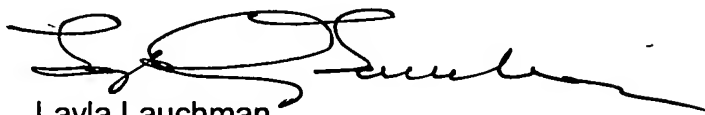
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri T. Ton whose telephone number is (571) 272-9064. The examiner can normally be reached on 8:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



March 29, 2006
Examiner Tri Ton/SN



Layla Lauchman
Primary Patent Examiner
Art Unit 2877
Technology Center 2800